

What is claimed is:

- 1        1. A communications network comprising:
  - 2              a connection-oriented subnetwork;
  - 3              a permanent topology of routers coupled to the subnetwork and
  - 4              interconnected by virtual circuits, the routers further comprising:
    - 5                  means for calculating a shortcut path through the subnetwork;
    - 6                  a forwarding table comprising a first entry along a path through the
    - 7                  permanent topology and a second entry along the shortcut path; and
    - 8                  means for establishing a virtual circuit to another router along the
    - 9                  shortcut path;
- 1        2. The communication network of claim 1 wherein the virtual circuits
- 2        interconnecting the permanent topology of routers are permanent virtual circuits.
- 1        3. The communication network of claim 1 wherein the shortcut is an
- 2        intra-area shortcut.
- 1        4. The communication network of claim 1 wherein the shortcut is an
- 2        inter-area shortcut.
- 1        5. The communication network of claim 1 wherein the routers further
- 2        comprise means for receiving and processing link state packets containing connectivity
- 3        information broadcast by another router.

1           6. The communication network of claim 1 wherein the routers further  
2 comprise means for receiving and processing link state packets containing shortcut  
3 information broadcast by another router.

1           7. The communication network of claim 1 wherein the subnetwork is a  
2 non-broadcast multiple access network.

1           8. The communication network of claim 1 wherein the subnetwork is an  
2 ATM network.

1           9. A method of operating a router in a communication network coupled  
2 to a connection-oriented subnetwork comprising the steps of:  
3           receiving a link state packet;  
4           using information in the link state packet to compute a permanent path to a  
5 destination address;  
6           using information in the link state packet to compute a shortcut path  
7 through the connection-oriented subnetwork to the destination address; and  
8           storing in a forwarding table  
9           a first entry to a router along the permanent path and  
10          a second entry to a router along the shortcut path through the  
11 connection-oriented network.

1           10. The method of claim 9 wherein the shortcut path through the  
2 connection-oriented network is to a router on the permanent path to the destination  
3 address.

1           11. The method of claim 9 further comprising the step of setting up a  
2       virtual circuit along the shortcut path through the connection-oriented network to the  
3       destination address.

1           12. The method of claim 9 wherein the subnetwork is a non-broadcast  
2       multiple access network.

1           13. The method of claim 9 wherein the subnetwork is an ATM network.

1           14. A method of operating a router in a communication network having a  
2       plurality of interfaces to at least one connection-oriented subnetwork comprising the  
3       steps of:

4           assigning a number to each of the interfaces;  
5           grouping the interfaces into connectivity classes;  
6           encoding information identifying the interfaces and the connectivity  
7       classes into a link state packet; and  
8           transmitting the link state packet to other routers in the communication  
9       network.

1           15. The method of claim 14 wherein the link state packet is an OSPF link  
2       state advertisement.

1           16. The method of claim 14 wherein the link state packet is in an opaque  
2       format.

1           17. The method of claim 14 wherein the subnetwork is a non-broadcast  
2       multiple access network.

1           18. The method of claim 14 wherein the subnetwork is an ATM network.